Information System Danger Signals

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In designing a computer-based information system, which more and more small companies are using these days, the small businessman can learn from these common mistakes of his larger contemporaries—

INFORMATION SYSTEM DANGER SIGNALS

by John H. Barnett

THIS ARTICLE presents a word or two of warning to the small businessman. The nature of information systems is discussed, and four principles of information systems are identified. The article suggests ways these principles can be used by our small entrepreneur to avoid traps already fallen into by his large-business counterparts.

Small firms new target

Computer costs are coming down; both the big and small computer manufacturers are directing marketing efforts toward the small businessman; and the number of computer time sharing salesmen offering package systems for small businessmen is naturally increasing with the substantial mushrooming of computer time sharing companies.

The small businessman is or shortly will be facing the data processing proposal.[1]

For example, consider this excerpt from a recent full-page advertisement in a leading national weekly news magazine:

TIME-SHARING
SMORGASBORD
. . . We also have over 300 free programs, including the "small businessman's package," which serves up a full course in payroll and accounting.

or the following from the Sunday business section of a metropolitan newspaper:

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[1] The author suggested some guidelines to evaluating a computer proposal in "The Data Processing Proposal," *College and University Business,* October, 1965.

COMPUTER WORKSHOP
PLANNED BY SBA,
(LOCAL) UNIVERSITY
Small-business owners will be shown how to computerize parts of their operations at a workshop Thursday sponsored by the Small Business Administration and the (local university) . . .

The following paragraphs describe a few road hazards to the small business that are omitted in the travel brochures of the computer age. These hazards are mirrored by the failures and disappointments of computer information systems that may not be familiar to the small businessman.

The author participated in a survey in which 865 non-computer executives at the presidential or vice-presidential level of 655 major U.S.

corporations expressed their opinions of their companies' achievements in computer information systems. The results were significantly different from what the small businessman might expect.

Forty per cent of the executives expressed dissatisfaction with achieving even the *original* goals of their first computer installations. Eighty per cent of the companies had had computers for five years or more. After five years, executives' expectations have still not been met.

Secondly, an even larger percentage (45) of the executives were dissatisfied with the scope of their present computer efforts. Finally, there was almost universal agreement (75 per cent) that their companies had failed to utilize the computer's capabilities.

These warnings and danger signs are, of course, not as often heard by the small businessman, who hears only of the instant computerized reservation systems or of the broadcasting networks' computerized election results. He doesn't hear of the experience of these same networks: wrong slides and commercials, incorrect audio, and similar on-air errors traced to the computerized switching system, at one time at a rate of over 100 errors per month. A startling list of errors has been compiled by computer cynics. Their record to date is the loss of $107,000,000 in equipment through computer error when NATO left France.

To pinpoint the reasons for this failure in information systems let

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us first pinpoint the role of an information system in a business.

Each business has a strategy. This strategy may be a well defined, fully documented corporate strategy stating corporate objectives in market share, asset size, and profit return terms for future five-year phases, or it may be the unspoken (but equally real and much more meaningful) inner sense of security, financial position, and personal satisfaction of the small businessman.

Strategy analysis basic

This business strategy should then determine the structure of the firm. This structure is made up of an organization and an information system. The organization is people with areas of responsibility and authority, while the information system is a procedure to gather and present information throughout the organization, which organization then interprets this information. A management information system is one to present only those data to management that it needs for managerial decision making purposes.

An example may help to define these terms. A manufacturer of sewing machines operated for decades with a strategy of selling throughout the world a long-lasting, (high-priced relative to income) sewing machine fully supported by consumer financing and extensive retail outlets capable of demonstrating and teaching machine operations. The product and the promotion of the product were well defined and constant, so the organization was extremely centralized by function with all matters settled at corporate headquarters. For example, each of the ten thousand retail outlets through the world reported daily salesmen's expenses and automobile expenses by license number to corporate headquarters in the United States. Profits were reported in essence only at one level for all country operations and all products in total. With the emergence of the Japanese sewing ma-

chine industry after World War II, this manufacturer found itself with excess capacity facing often equal- and sometimes superior-quality machines being sold at frequently one-third his product's price. A new strategy was necessary, and the company turned to setting its house in order and diversifying.

The old organization and the old information flow were no longer appropriate. The centralized functional organization was discarded for a decentralized, regional, multi-functional one. To assess managers and markets, profit centers by country were installed, along with a standardized chart of accounts and a system of budgets established locally. Retail outlets were encouraged to purchase locally and sell any items they desired, and factories were told to find other products to manufacture and sell.

The rate of implementation throughout the world was naturally different, recognizing differing local situations and varying capabilities of local and national managers.

Four fundamental principles

These definitions and the illustration underline the following four relationships or four principles of information systems:

— The proper information system is dependent upon the strategy of the firm.
— The users of the information flow have a substantial influence on the design of the information flow, second only to that of the strategy.
— The information flow is both procedure and content, with content being of principal importance.
— The information flow can concern itself with past data for historical or control purposes, such as salesmen's expenses, or with present and future data for planning purposes, such as budgets.

These principles have been ignored with the age of the computer, and thus information systems

No computer manufacturer can tell any business what its strategy should be . . .

have failed because of a know-how gap.[2] The marketing manager charges that the computer manager doesn't understand marketing problems and that no computer manufacturer will tell him how to use the computer in marketing. The computer manager responds, "The marketing department knows nothing about computer simulation." This knowledge gap is just what we would expect with such a significant advance in methods of management as the computer offers. It takes time to close the gap, a lot of time, and the information principles must be recognized and incorporated into computer information systems.

Information systems are properly dependent upon the strategy of the firm. No computer manufacturer can tell any business what its strategy should be. Therefore, no computer manufacturer can tell any business what its information system should be.

This is particularly true and important in a small business. Small business strategies involve personal objectives and satisfaction much more than financial ratios and earnings per share measures. The small business strategy, being personal, cannot be defined by another. The small business owner must lead in the definition of his information systems, since he has been the sole definer of his strategy.

The users of an information system also influence its design. While a large corporation has various levels of sophistication and expertise, a small business does not. Management resources are often

[2] The author describes this gap in "Information Systems—Breaking the Barrier," *Journal of Systems Management,* May, 1969. Suggestions on closing this gap were included in "Non-Computer Executives and the Computer," *Journal of Systems Management,* December, 1969.

limited to just one or two people; their specific talents and knowledge are crucial to the design of an information system.

These talents and knowledge must be incorporated in the information system. A sophisticated standard cost computerized information system is of no use to one who is not familiar with the nature and causes of standard cost variances.

Gear system to user

One example illustrates the danger of the information system designed without considering the abilities of the user. A participant in a small business institute the author recently conducted described a packaged accounting system she had bought and was using in her antique business. It involved recording as the monthly cost of merchandise any payments for merchandise made that month. There was no procedure for inventory. Thus she believed she had incurred huge losses in October and November when she paid for goods ordered for the Christmas season.

Simple? Yes!

Useful? No!

Harmful? Yes! The owner believed in the system's accuracy; how much more might a small businessman trust the information coming from the "giant brain"!

The content of an information system is of importance and should dominate the procedures. The first thought of the small businessman should be: What are the decision points in my business? For example, in purchasing inventory the decision points are what, how much, and when to buy.

Next, the businessman should ask: What information is necessary or helpful in making that decision? What should the content of the information system be? Systems anal-

ysis and design, then, depend mostly on common sense and business judgment—what decisions are to be made and what data are needed.

For the final step the small businessman might turn to others for help *if the information content is already defined.* This is a technical part of systems design, but it is of secondary importance compared to knowing what information is needed. How can he get this required information? Computer time sharing salesmen and manufacturers can assist here only if the businessman has answered the first two questions. Danger and risk await the small businessman who first calls in a computer salesman and asks, "How can I use your computer in my business?"

Content should be stressed

This emphasis on procedure instead of content in information systems is what has resulted in the frustrations of large companies' information systems. Today's much publicized third generation computers, with all their high speed and real time capabilities, are generating reports unsatisfactory to most of the large corporations' top managers.

This lack of success is due to a concentration on paper flow, report flow, and procedures and an ignoring of the much more important flow of decisions. Putting speedier wheels under the old automobile, reinforcing present paperwork procedures, and ignoring the fundamental purpose of the information — these are the expedient means of too many systems analysts and designers.

Let's consider an illustration for the small businessman. The time shared computer salesman describes his packaged accounting system; you ask if you could in-

pare against actual figures. Rather than think of your managerial needs, the salesman thinks that the budget will mean both expensive reprograming of the computer and extra computer files for the budget data. He answers, "No, but all of our users prefer to use our automatic system and then refer to the past month's reports we've sent you. They're better than a budget. Look at all the percentages the computer calculates."

The information system should provide management with planning as well as historical data. This relationship highlights a further manifestation of the knowledge gap: While many companies have seen how to use the computer for recording purposes, they have not succeeded in using the computer for planning. Many accounting people with a little help from the computer maker have seen how to do payrolls and customer billings. Many sales managers have seen how to sort and present sales data "five ways from Sunday"—by product, by customer, by salesman. But few have used past sales versus budget to project future sales and profits for pricing changes, reorder, sales hiring, and advertising planning.

These four ideas or principles should be kept in mind as the small businessman starts investigating computer systems in detail. Secondly, a few related suggestions might make the starting a little easier.

Small business characteristics

Two characteristics of the small business must be reviewed. The first characteristic is one of temperament and habit. The small businessman is a man of action not used to delegating responsibilities for decisions. He is frequently used to making on-the-spot decisions, occasionally off the top of his head, both because of a lack of information and because he likes to operate this way. Entrusting information responsibility to other men or

Secondly, a small businessman wants to minimize his company's economic exposure to risk. One mistake can be one mistake too many.

Finally, the same know-how gap that plagues big business also hinders the small businessman. Nonetheless, he is in a much better position relative to the big businessman. Unlike the specialized big businessman, the small businessman has a much wider view of his business and thus a much better perspective on the decision points and the data he needs at these points.

Small business advantages

To the small businessman, then, we can say, "You can progress with your common sense and business judgment much farther in information systems than other businessmen. This will be gradual progress, best viewed as experimenting and improving. Keep in mind one basic concept about the computer. Think of it as 500,000 clerks that you have rented for one hour to do all your computing work. Instructions (the computer program) must be well thought out and thorough. Since these clerks are to do all the work, exceptions and errors must be planned for; the computer is a funnel through which all transactions must pass. Finally, there are 500,000 of these clerks; in theory, *any* information you want can be obtained. There need be no compromises in your information system."

The unnaturalness of thinking about information instead of taking action, the importance of minimizing risk, and the benefits of gradual experimentation with computer usage all point toward the use of a computer service utility. This utility might be a computer service bureau, a joint installation with several other companies, or a time shared computer system in which the small businessman operates his own remote terminal. In the case of the service bureau or

time shared computer, he can limit his economic risk and can also get the benefit of computer experts on the procedure element of information systems.

Conclusion

We have reached five major conclusions and suggestions for the small businessman.

First, the small businessman, being the only one aware of his strategy, is the only one that can design an information system for himself. Others can help, but the basic objectives and foundations must be his.

Second, the knowledge and talents of the individual or organization must be considered in designing an information system.

Third, the small businessman should identify the decision points and the information needed at those decision points in his information system. This required information will be the content of the information system. Once this content is identified the small businessman may look to others for assistance with the procedures.

Next, the major failing in computer systems is the failure to use the machine as an aid in planning, and this failure is due to the knowhow gap and to a failure to recognize the four principles of information systems.

Finally, characteristics inherent in the small business suggest that the small businessman gradually enters into computer usage, viewing this computer age as an evolutionary and not a revolutionary one. This gradual entrance may be most easily and most safely accomplished through a computer service.

Being forewarned of the thunderhead clouds ahead, the small businessman may steer a safe course around them to arrive at a planned destination. The information that he needs is waiting, with few, if any, compromises required. Relying on his common sense and business judgment, he can successfully enter the computer age.